



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

215 Fremont Street
San Francisco, Ca. 94105

0 8 SEP 1987

Memorandum

Subject: Review Comments for Naval Air Station Moffett Field
Sampling Plan

From: Lewis Mitani *Lewis Mitani*
Federal Response Section, T-4-3

To: Tom Berkins
Regional Water Quality Control Board
San Francisco Bay Region

Please find enclosed the Environmental Protection Agency's (EPA) comments for Naval Air Station Moffett Field Sampling Plan. The revised Sampling Plan has been reviewed for technical competence and compliance with Region IX protocol. Comments and questions are listed according to the nature of comment.

**Comments for
Naval Air Station Moffett Field
Sampling Plan**

General Comments

1. The proposed Sampling Plan adequately addresses the objectives of the Plan in terms of additional borings and monitoring wells to be constructed in a phased investigative effort for the ten sites specified in the Sampling Plan. The sampling plan ~~does not adequately address all waste release areas/contaminant sources at Moffett Field but rather emphasizes the characterization and distribution of contaminants in the groundwater at sites earlier identified in the Initial Assessment Study and in the Verification Step of the Confirmation Study.~~

2. The Sampling Plan addresses data deficiencies from monitoring wells in which water quality data is not representative of the groundwater zones intended for sampling. The proposed elements of the Sampling Plan (boring, monitoring well installation, soil and water sampling and analyses) should prove technically adequate and defensible when the deficiencies in the sampling protocol and QAPP are addressed in the final Sample Plan and QAPP.

3. Certain data gaps are apparent in the Sampling Plan. These are:

a. The Sample Plan does not specifically address the fate of contaminants in relation to potential and actual impacts on San Francisco Bay/nearshore wetland environment/deep aquifer zone contamination. The Sample Plan however does have as its objective, evaluating chemical migration pathways on the basis of information to be collected as part of this sampling effort. This effort is to be carried out in a phased approach to define the extent and level of contaminants in the groundwater and in identified surface receptors such as Marriage Road ditch.

b. Since the Sampling Plan does not fully address potential or actual contaminant sources, e.g. underground tanks and other waste release areas, it is questionable whether the investigative program proposed for the ten specified sites will lead toward fully characterizing contaminant plumes in groundwater or soil contamination.

- c. The Sampling Plan is not clear on whether the investigation of potential conduits, e.g., existing and abandoned supply wells, is included as part of this Sampling Plan. If so, the investigation is not addressed in the Quality Assurance Project Plan, nor does the potential conduits Work Plan address the requirements of a sampling plan. It should be noted that the Work Plan prepared by Earth Science Associates, February 1986, included an assessment of public and private wells to act as potential conduits for inter-aquifer cross-contamination as part of the study effort intended for this Sampling Plan.
4. The intent of this Sampling Plan should assure the representativeness of aquifer zone groundwater sampling although the methodology for monitoring well construction needs refining as subsequently discussed.
5. The protocol proposed for soil and water sampling analyses should provide representative samples. However, the methodology for collecting soil and water samples ~~should be clearly stated with a selected procedure identified in the Sampling Plan.~~ Many of the procedures described are subject to field decisions or have not been decided upon in this Sampling Plan.
6. As described in Item 5, a definitive approach to describe not only sampling methodology but drilling method, type of mudding additives, type of materials to be used for monitoring well construction and completion including development procedures, should be clearly identified in Section 4 of the Sampling Plan. As presently stated, much of the methodology described is subjective and by implication to be decided in the field. Considering the amount of data available from past investigations, a more concise attempt to describe and select an appropriate methodology can be made.

7. The Sampling Plan primarily addresses groundwater contamination to a lesser extent, soil contamination and efforts to identify contaminant sources. ~~Interim Remedial Measures in progress (e.g., at specific UGI sites) or under consideration by. Measures should be either included or integrated into a comprehensive RI/FS effort which considers all waste release sources on base.~~

8. Section 4, Methods and Procedures, does not provide a clear and concise approach in describing drilling and well construction methodology.

Procedural

1. Page 2.2, paragraph 1: list the basic criteria to be used in determining when locations will be modified. Who will make the decision? The reporting and decision process between phases 1 and 2 need to be clearly explained in this sampling plan.
2. Page 3.1, last paragraph: provisions for EPA to obtain split samples should be described.
3. Page 4.13, paragraph 4: protective plastic sheet should be used regardless of surface conditions.
4. Page 4.14, paragraph 2, line 3: it is implied that a protective plastic sheet will be used from one site to another until worn out. To prevent potential dispersion of contaminants from one drilling site to another, a clean plastic sheet should be dedicated to each drill site.

5. Page 4.15, second line: treatment and disposal facility should also be EPA approved.
6. Page 4.15, paragraph 2, third sentence: presumably, this means that the location of the sounder cable at the top of the casing will be marked on the cable.
7. Page 4.15, item 4.5.1: it should be stated that the method by which water levels are obtained should be clearly stated in field notes and in subsequent reporting.
8. Page 4.16, item 4.6.1, paragraph 3: the method of introducing a sample into a glass jar is inappropriate if analytes include VOC.
9. Page 4.17, paragraph 2: should state that ice chests will contain ice to maintain a specified temperature range, if required.
10. Page 4.17, paragraph 2: soil samples (organics) should be chilled to 4°C.
11. Page 4.18, top of page: how are field duplicates obtained? Suggest including comments on field duplicates from Page 4.19 to Page 4.18.
12. Page 4.18, item 4.6: the discussion of groundwater collection procedures is incomplete. Further details are required as to filtering procedures, container preparation, etc. See QAPP comments for further input on information required.
13. Page 4.18, item 4.7: what type of soap will be used?
14. Page 4.19, item 4.8, paragraph 2: blank samples should be of certified organic free water.
15. Page 4.19, paragraph 2: samples taken sequentially are not true duplicates. The duplicate sample sets should be filed in parallel for each parameter.
16. Page 4.19, item 4.8, paragraph 4: how many blank samples will be sent to the lab? One per shipment? Be specific.
17. Page 4.19, item 4.8, paragraph 5: "one per day" should read "a minimum of one per day per site per matrix."
18. Page 4.19, item 4.8, paragraph 6: laboratories used should be EPA approved. Are no splits for the first monthly samples to be obtained?

19. Page 4.19, item 4.8, paragraph 7: soil background and duplicate samples are required.
20. Page 4.19, item 4.8, paragraph 7: are duplicate soil samples to be collected in the field?
21. Page 4.20, paragraph 1: the name of the other DHS-certified lab should be provided.
22. Page 4.20, last paragraph: be specific as to the supporting documentation to be provided so that compliance with EPA requirements can be established.
23. Table 4-2: TOC samples should be chilled to 4°C.
24. Page 6.1, item Section 6: there is no mention as to how and when agencies will be informed of actual sampling dates, so that oversight of field activities can be scheduled. How will agencies be informed of phase 1 results to be able to make determinations for phase 2?

Technical

1. Page 1.3, paragraph 1: how will additional sites, if any, be identified?
2. Table 1-3: suggest that all of the listed MEW wells be shown on the appropriate figures: for site 8 - Figure 2-7; site 9 - Figure 2-8; site 10 - Figure 2-9. This has been done in part on Figure 2-9. It is further suggested that these wells be evaluated as potential sampling and water level control points in this Sampling Plan.
3. Page 2.2, paragraph 4: were quality control procedures conducted for previous soil and water sampling? QA/QC and installation procedures should be summarized to allow judgement on integrity of earlier data and potential validity problems, if any, with use of wells. What level of certainty is associated with the previous data?
4. Page 2.5, section 2.3: no mention of soil gas sampling which was referred to earlier on p. 2.3.
5. Page 2.6, paragraph 6: it is unclear how the runway landfill relates to the landfill containing refuse, scrap equipment, and hazardous waste.
6. Page 2.7, paragraph 2, line 2: what other sites are being referred to, other areas of contamination or background sites? Put the concentrations in perspective by reference to applicable criteria and standards.

7. Page 2.9, paragraph 3: at what depth were borings and wells completed?
8. Page 2.10, item 2.5.3, first paragraph: why are soils not to be analyzed for BNAs, while the water samples are?
9. Page 2.10, paragraph 4: since PCBs were found at a depth of 6.0 to 7.5 feet at this site, the soil should be analyzed to at least this depth, not to just 5 feet.
10. Page 2.11, paragraph 3 and Table 3-1: since fuels and waste oils were disposed of in the storm drains at site 3, BNA analysis should be performed on the soil samples from this site.
11. Page 2.11, last paragraph: be more specific as to what is meant by elevated ranges of metals.
12. Page 2.12, paragraph 3: mention is made of a 500-gallon unleaded fuel tank; have any studies been made or in progress to determine whether the tank is a source of contamination? In general, the sampling plan does not specifically address any steps to confirm whether this tank or others identified by ERM-West and Aqua Resources are sources of contamination. Such information is required to more fully characterize contamination onsite in order to prepare a remedial action plan that not only considers groundwater contamination but soil contamination and source identification as well.
13. Page 2.12, item 2.5.2: why aren't subsequent drainage paths past the ditch included in the soil sampling program?
14. Page 2.13, paragraph 2: since soil contamination was found at depths greater than 5 feet, taking soil samples at only 5 feet is inadequate.
15. Page 2.14, paragraphs 1 and 2: mentioned is disposal of wastes at the runway apron and hangars 2 and 3. It is not clear whether these disposal sites have been or are being investigated to determine the degree and extent of soil contamination. No specific soil sampling program is addressed in the Sampling Plan for a soil characterization study at these sites. See comment 12.
16. Page 2.15, paragraph 3: see comment 12.
17. Page 2.15, paragraph 4, line 10: mentioned is "a separate Interim Remedial Measure program." This program and its objectives should be described in the context of this Sampling Plan. It is not clear what other activities for site cleanup are being done in addition to those mentioned

in this Sampling Plan nor how the results of such activities complement the objectives of this Sampling Plan.

18. Page 2.17, first paragraph, last sentence: how often will sampling be conducted in the first 3 months?
19. Page 2.17, paragraph 4: mentioned are French drains. The Sampling Plan does not address these drains and associated soil characterization of contaminants that originated from these drains. Soil characterization on the basis of one boring, A5-3, is not sufficient.
20. Page 2.18, paragraphs 4 and 5: mentioned are underground and nonspecified tanks. The Sampling Plan does not address any efforts to determine whether tanks are leaking or soil characterization studies required to identify contaminants should leakage have taken place. See comment 12.
21. Page 2.18, item 2.7.2: expand objectives to include soil characterization around drains and tanks. Incorporate tank leakage information as appropriate from the Underground Tank Study.
22. Page 2.19, paragraph 5: soil contamination was found at depths of 3 to 4.5 feet and 6 to 7.5 feet, so soil should be sampled in these ranges and not just at the 5-ft depth.
23. Page 2.20, paragraph 3, last line: be specific as to what other "sites" are being referred to. Are the other sites contaminated or representing background levels?
24. Page 2.20, item 2.8.2, first paragraph: what media are being investigated for further contamination, soils and/or water?
25. Page 2.24, paragraph 7: the review of underground tanks, piping, and utilities should have been completed prior to this Sampling Plan in order to provide a definitive program for the investigation of source areas, actual or possible. Current work to establish whether tanks are leaking and any related investigations should be described in this Sampling Plan. See comment 17.
26. Page 2.25, paragraph 2: mentioned are underground tanks. See comment 12.
27. Page 2.25, paragraph 2; page 2.26, paragraph 5; and Table 3-1: since tanks 19 and 20 were fuel storage tanks, soil samples taken during the drilling of wells intended to monitor downgradient of these tanks should be analyzed for BNAs.

28. Page 2.25, paragraph 4: mentioned is recent work by ERM-West. A description of this work including investigative results should be provided in this Sampling Plan to assess necessary additional efforts required to remediate a source problem and associated soil contamination. Is this work being conducted in accordance with EPA requirements? Are adequate QA/QC procedures being followed?
29. Page 2.26, paragraph 1: based on criteria established in this Sampling Plan, it would appear that well W10-4(B1) should be labeled W10-4(B1X).
30. Page 2.26, item 2.10.2: be more specific as to the type and extent of work required.
31. Figures at end of Section 2 should also show the locations of all proposed soil borings, buried tank, spill areas, and containment facilities in order to provide a more comprehensive overview for investigative activities proposed in this Sampling Plan.
32. Table 2-2: location of surface and shallow soil samples should be identified in the appropriate figures. See comment 31.
33. Table 2-3: location of waste storage facilities should be identified in the appropriate figures. See comment 31.
34. Page 3.3, last sentence: such discussions should be a part of this document where analytical problems are presumed likely to occur.
35. Tables 3-1 and 3-3: soils analyses and water analyses for the same site do not match. Explain the differences and rationale for the omissions.
36. Page 4.2, first line: what provision will be made for placement of soil gas sample probes in areas where tidal influence is expected? How will one foot above water table be determined?
37. Page 4.3, paragraph 3: what is meant by the term significant trend? How will this be established?
38. Page 4.4, paragraph 4: the method of logging each drill hole is not clear, e.g., continuous core cuttings, difficulty of drilling, samples taken of selected depths. Presumably, we're talking of continuous cores and cored samples taken at selected depths, as well as drill cuttings. Will the rate of drilling penetration be logged in lieu of difficulty of drilling?

39. Page 4.5, item 4.2.1, paragraph 1: wireline coring method is not a drilling method but rather a sampling method.
40. Page 4.5, Item 4.2.1, Drilling Techniques: this section is not clear on drilling method. Reverse rotary methods are generally not suitable in areas of a shallow groundwater table. The drilling methodology should be clearly identified in relation to intent, e.g., boring for geophysical logging, completion as monitoring well, extraction or observation well, depth ranges for well completion with drilling methods identified to well/borings to be drilled during Phase 1.
41. Page 4.5, item 4.2.1, paragraph 5: it should be identified when or under what conditions wire-line coring will be performed. A brief description of this coring method and for what purpose it is to be used, e.g., lithologic description. It should be noted that wire-line samples are not to be used for chemical analysis. Again, the wire-line method is not a drilling method. See comment 39.
42. Page 4.5, item 4.2.2, end of paragraph: "etc." implies other physical analyses; these should be spelled out.
43. Page 4.6, paragraph 1: it would be useful to have a table indicating which wells/borings are to be continuously cored and the method of coring specifically identified in relation to some established criteria, e.g., such as depth to which sampled.
44. Page 4.6, paragraph 4: what are the various reasons for not being able to core continuously based on known geologic conditions?
45. Page 4.7, paragraph 1: provide criteria for doing additional shallow geophysical logging. On the basis of available information, list those A-aquifer wells to be logged.
46. Page 4.8, item 4.3.1, paragraph 2: rational for using 2-in. PVC casing is poor since it is difficult to forecast yield. It is suggested that a table be used to indicate type and diameter of casing and well screen to be used and that efforts be made to standardize construction materials in relation to type and depth of well and anticipated chemicals that may require use of stainless steel casings and/or screens with reasons for their selection as appropriate.
47. Page 4.9, paragraph 1: wells for which stainless steel casings and screens are to be used should be identified. See comment 46.

48. Page 4.9, paragraph 5: the use and spacing of casing centralizers should be specified, not shown "and elsewhere, as warranted."
49. Page 4.9, paragraph 6: the use of calcium chloride should be specified to allow for quick set of grout. If not, what are the criteria for not using it? It should be noted that in subsequent sections, a minimum 24-hr period is described for allowing the grout to set, suggesting that CaCl will be used (see Page 4.12, paragraph 3).
50. Page 4.10, paragraph 1: the use of a tremie pipe should be clearly defined in relation to the annulus space between the borewall and outer casing diameter. Under some conditions, pressure grouting through the casing bottom may be a preferred procedure.
51. Page 4.10, paragraph 5: why may it be necessary to ream out holes in lieu of committing the use of 10 or 12 drilling bits for A-aquifer wells?
52. Page 4.10, paragraph 6, line 3: suggest adding "and well screen" following "casing." As a general comment, the type of screen is not described. Are these machine slotted PVC screen, louvered or spirally wound stainless steel screen, hand slotted? How attached to casing: screw on, welded?
53. Page 4.11, paragraph 3, last sentence: "aquifer zones" - does this refer to C-aquifer or to B-1, B-2, B-3, and C-aquifer?
54. Page 4.11, paragraph 4: in what cases would a 16-in. auger be used and under what conditions would a rotary method be used? See comment 40.
55. Page 4.12, paragraph 2: grouting procedure is not clear and not well defined. What is meant by "pressure grouted at the base of the conductor casing?" Procedure should be described in greater detail.
56. Page 4.12, paragraph 4: it should be decided what drilling method will be used. What is an air-rotary casing hammer method? As a general comment, all selected drilling methods should be described in greater detail and evaluated in relation to their applicability in achieving stated objectives.
57. Page 4.12, item 4.3.3, paragraph 1, line 6: not clear for the need of temporary packers above the screened interval. What does the airlift assembly consist of in relation to casing diameters?

58. Page 4.12, item 4.3.3, paragraph 1, line 9: what is meant by recharge? Criteria selected for duration of development not clear.
59. Page 4.12, item 4.3.3, paragraph 1: what criteria is used to determine if development is by airlift, mechanical pumping, or bailing? What type of pump is proposed for development? What type of bailer? Specify materials.
60. Page 4.13, paragraph 1: why is potable, clean water introduced in the well? What about materials that collect in the well during surging; how are these removed? What is the minimum casing diameter for effectively surging the well?
61. Page 4.13, paragraph 2: where and how will the elevations be indicated on the top of the well, e.g., top of casing, top of cap, top of protective casing. It is suggested that the actual point at which the elevation is established be either marked or clearly identified by a description as to its location.
62. Page 4.13. Item 4.41, last paragraph, line 2: how will sampling of drum material be conducted? How much sample; how will it be packaged and shipped?
63. Page 4.13, last paragraph: for rotary-wash holes, how is it established whether the water is potable or what the chemistry of such water is? Also, using air-rotary, assuming air is the drill circulation media, how is water returned by air contained and disposed of.
64. Page 4.14, paragraph 3: how will the extracted water be contained during a pumping test before a decision can be made on its ultimate disposal? At what point will it be decided whether or not the water meets the criteria established by the RWQCB, Sunnyvale Sewer District or City of Mountain View's Maintenance Department?
65. Page 4.15. Paragraph 3: How will measuring equipment be cleaned and decontaminated?
66. Page 4.16, item 4.5.3: a description should be given on the installation elements of either transducers or strip chart water level recorders within the well casing and at the wellhead.
67. Page 4.16, item 4.5.3, paragraph 2: the word "probably" suggests other possible water level monitors in addition to the stated alternative; if so, what are they?

68. Page 4.17, item 4.6.2, paragraph 3: how is purged water contained before establishing disposal method. See comment 64.
69. Page 4.17, Item 4.6.2, paragraph 5: specify what pump and hose materials will be used.
70. Page 4.18, item 4.7, paragraphs 2 and 3: how is clean water defined?
71. Page 4.18, item 4.7, paragraph 2: drilling additives should be specified and defined.
72. Table 5-1, Site 1, Runway Landfill: methane gas has been previously reported. How will this impact well drilling activities and what contingencies are provided should such gas reach critical levels? This is not described in the Sampling Plan.
73. Page A.1, paragraph 3: how will water levels, barometric pressure, and tidal fluctuations be monitored?
74. Page A.1, paragraph 4, last sentence: sentence implies that wells in the A, B1, and B2 aquifers will be monitored concurrently during any pumping test regardless of which aquifer, A, B1, or B2, is being tested. Is this interpretation correct?
75. Page A.2, paragraph 2: see comment 74.
76. Page A.3, paragraph 5: pumping until reaching equilibrium is not a necessary criteria for establishing aquifer hydraulic parameters. A minimum time limit for pumping, e.g., 72 hours, is expected to be sufficient for pumping a shallow zone aquifer. What is the rationale for pumping B1 wells for a minimum 24 hours as opposed to 72 hours for A wells?
77. Page A.4, paragraph 1: how will barometric pressure be monitored? Are these data to be furnished by the Navy as recorded at Moffett Field? What about tidal fluctuations? Such fluctuations are likely to affect water levels during pumping tests. How will this be addressed and, if so, how and where will tidal fluctuations be monitored?
78. Page A.4, item A.2.6: given the relatively long-term pumping, will water quality be monitored during the pumping period? If so, what parameters will be monitored and at what interval?

79. Appendix B, Page 3: have any thoughts been given to performing tracer tests to establish potential conduits from shallow zones via gravel pack material? Information on the top of the gravel pack should be obtained if available from driller's records. It is possible that the pack may extend above the uppermost perforated section of the well.
80. Appendix B, Page 4: the use of mechanical seals installed within the well casing is of dubious value for wells completed with gravel pack. The pack material, which normally extends along the entire section of perforated and blank casing sections, can continue to act as a conduit for contaminant migration.
81. Appendix B, Page 9: it is suggested that the reported material include a hydrogeologic description of the deeper groundwater system in the area where the wells are located. Such information should include relative differences in the hydrostatic pressure in deep zones versus the C-aquifer and shallow zones and the piezometric surface, groundwater flow direction, and lithologic units of the deep aquifer zones that are potentially impacted by contaminants in the Moffett Field area.

Editorial

1. Page 1.4: the first sentence on this page is awkward. It is not clear what is being quantified and what is qualified.
2. Page 1.4: paragraph 3 is awkward. Suggest "on Moffett Field" be inserted following "installed."
3. Page 2.3: first sentence of last paragraph: correct "Pliestocene" to "Pleistocene."
4. Page 2.8, paragraph 6, line 1: "...sampled monthly for 3 months..." would be clearer.
5. Page 2.10; item 2.5.3, first paragraph, line 3: delete "and" at end of line.
6. Page 2.11: there are two Sections 2.5, an apparent error in the numbering system.
7. Page 2.16, item 2.6.3, paragraph 2: verb "be" is missing from sentence.
8. Page 4.2, paragraph 2, line 7: "an duplicate" meaning not clear.

9. Page 4.2, paragraph 2, last sentence: ". standards at selected...", should this read "for selected?"
10. Page 4.2, paragraph 2, line 10: insert "to" between "periodically" and "calibrate."
11. Page 4.3, paragraph 1, line 2: change "will be established" to "will establish."
12. Page 4.4, paragraph 1, line 4: "isocentration" - should this read "isoconcentration?"
13. Page 4.4, paragraph 4, line 9: suggest deleting "especially."
14. Page 4.6, item 4.2.3, line 2: suggest deleting "and" before aquitards.
15. Page 4.7, paragraph 3, line 6: delete geophysical.
16. Page 4.8, item 4.3, line 6: "reliable on lithologic..", is the word information missing?
17. Page 4.8, item 4.3.1, paragraph 1, line 3: change "piezeometric" to "piezometric."
18. Page 4.9, paragraph 5, last sentence: meaning of "above the below the" is unclear.
19. Page 4.13, paragraph 5, line 3: section 4.3.3 should read section 4.4.3.
20. Page 4.20, paragraph 5, line 1: "be" should be "by."
21. Table 4-1: title of table not consistent. Is it "List of Wells Adjacent to Geophysically Logged Borings" or "List of Wells to be Twinned by Geophysically Logged Borings?"